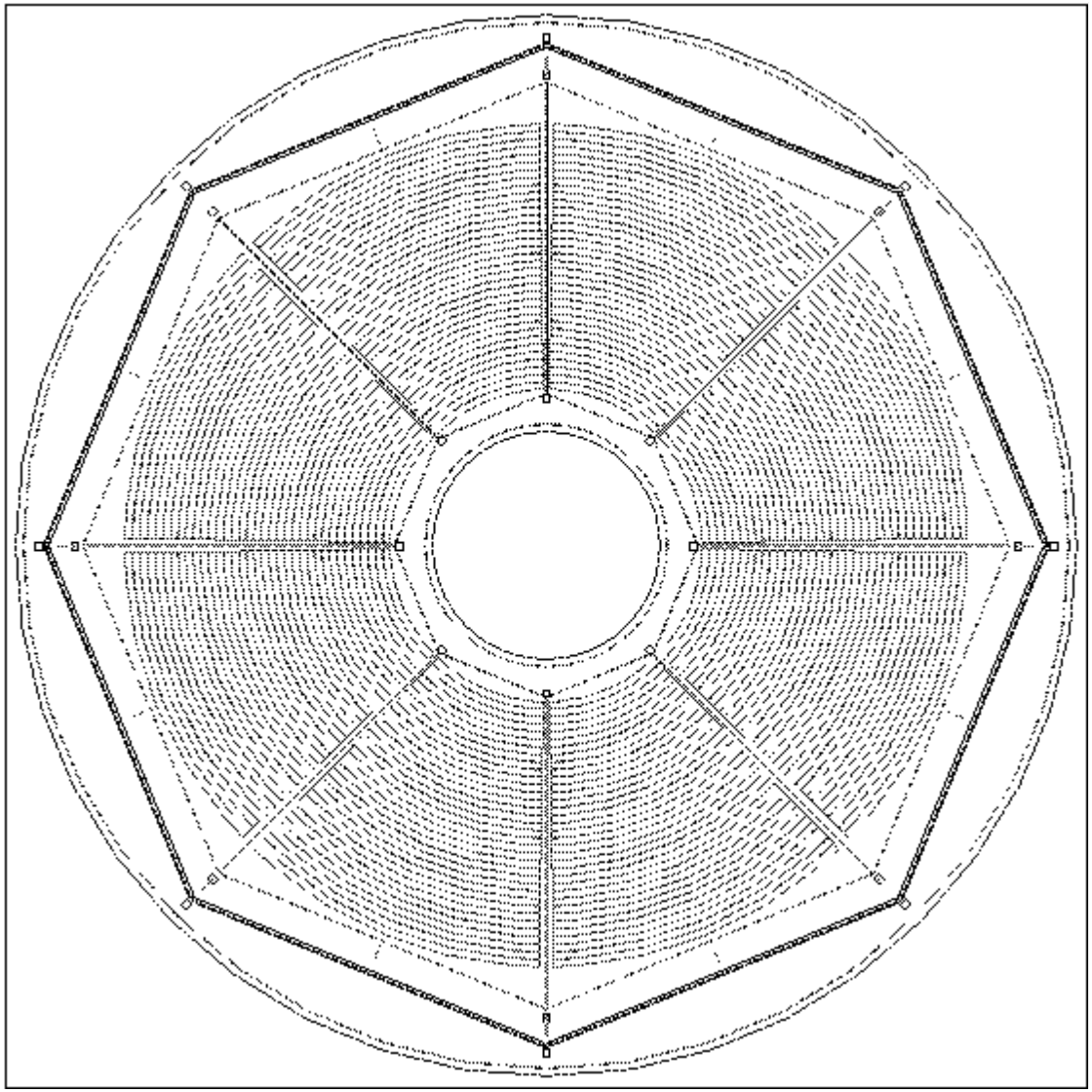
Simulation of an inner TPC/HBD in PHENIX

So far

- Started with GEANT standalone TPC/HBD simulation written by N. Smirnov for STAR
- Adapted it to fit PHENIX detector environment and put it into the PHENIX simulation package

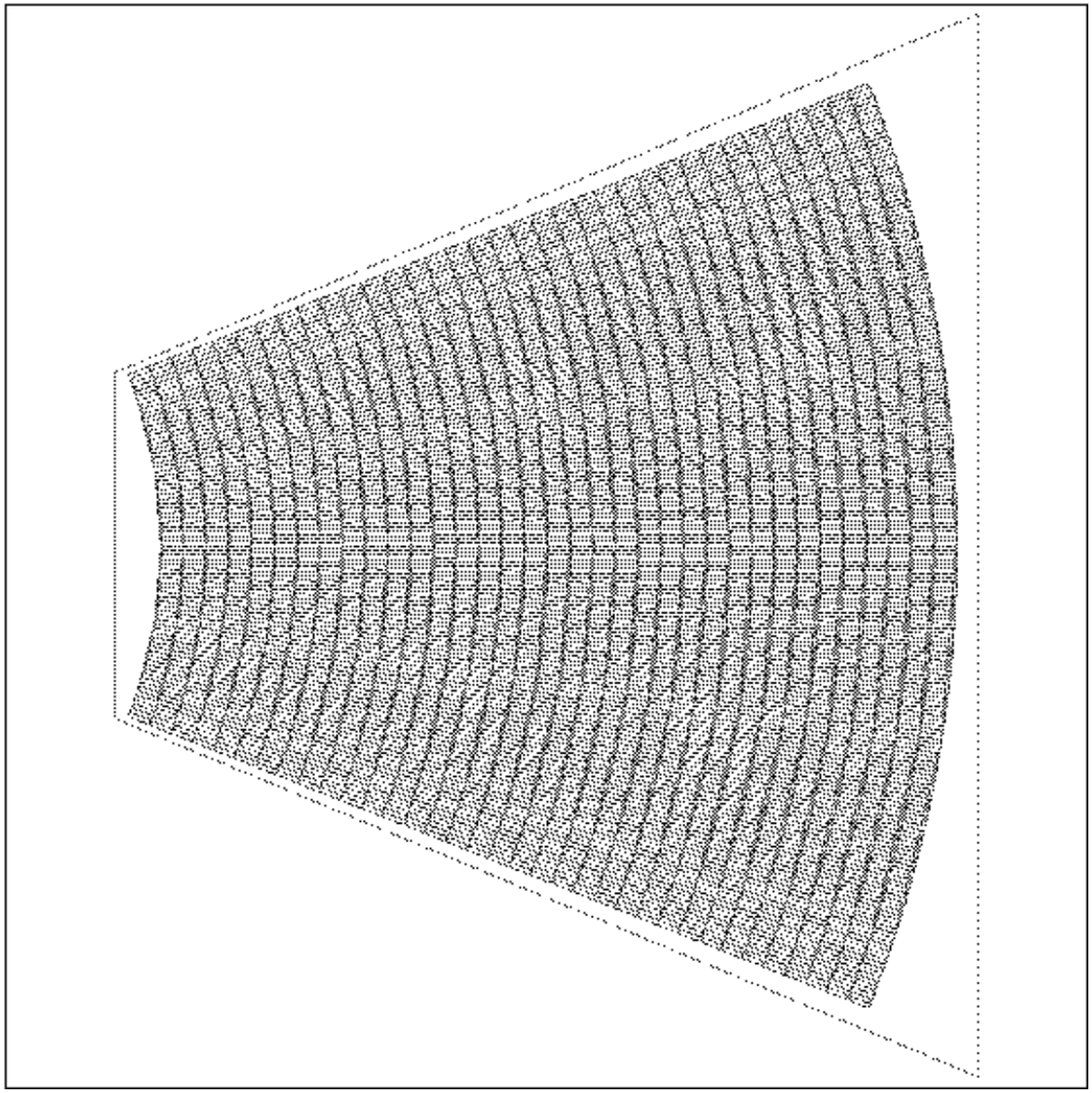
TPC

- Modular octant structure
- 35 cm drift distance in both directions along the z-axis
- Drift gas: CF_4 and others to be studied
- 35 pad rows for readout on both ends



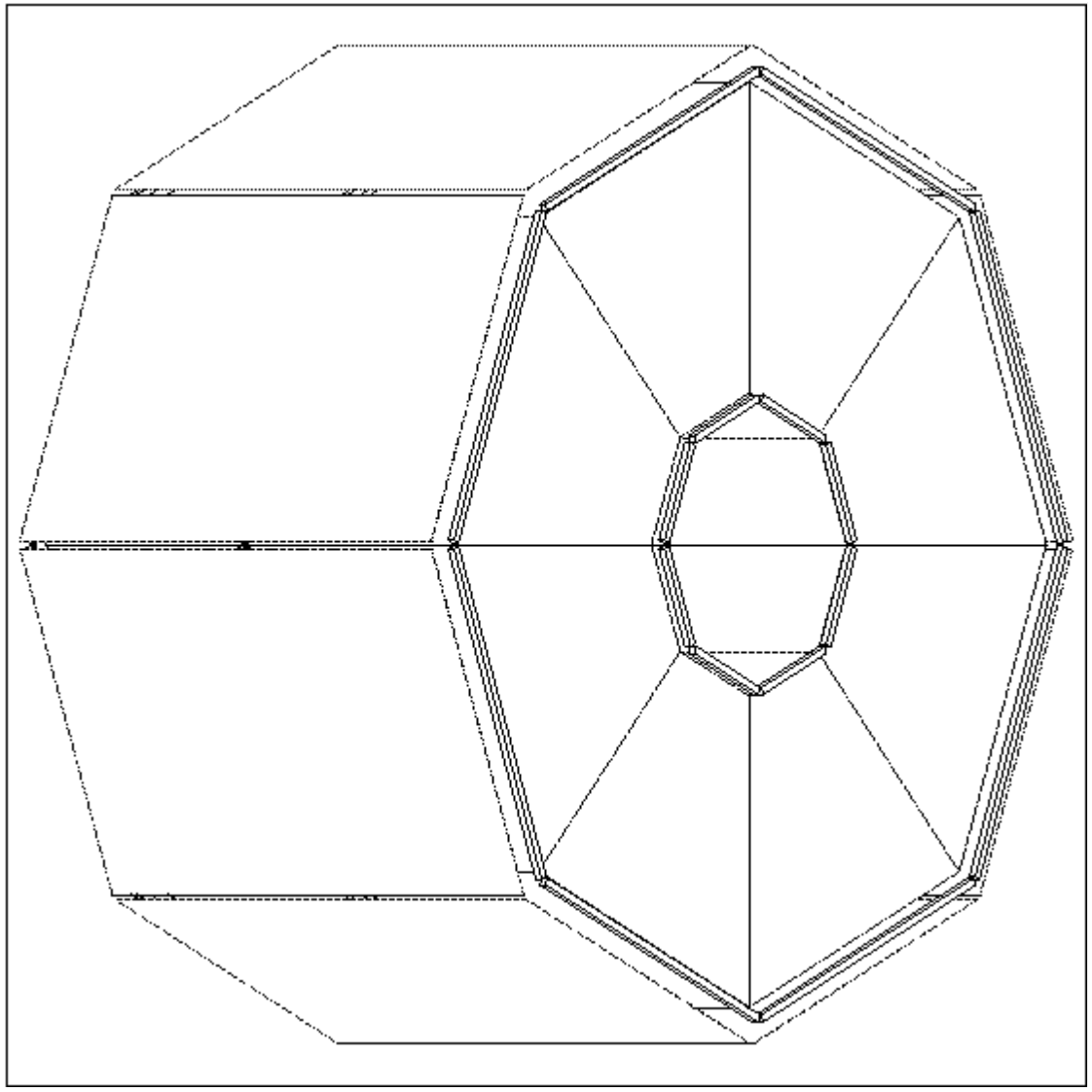
Pad geometry

- Current proposal is for 2x10mm pads, for all values of r (20-55 cm)



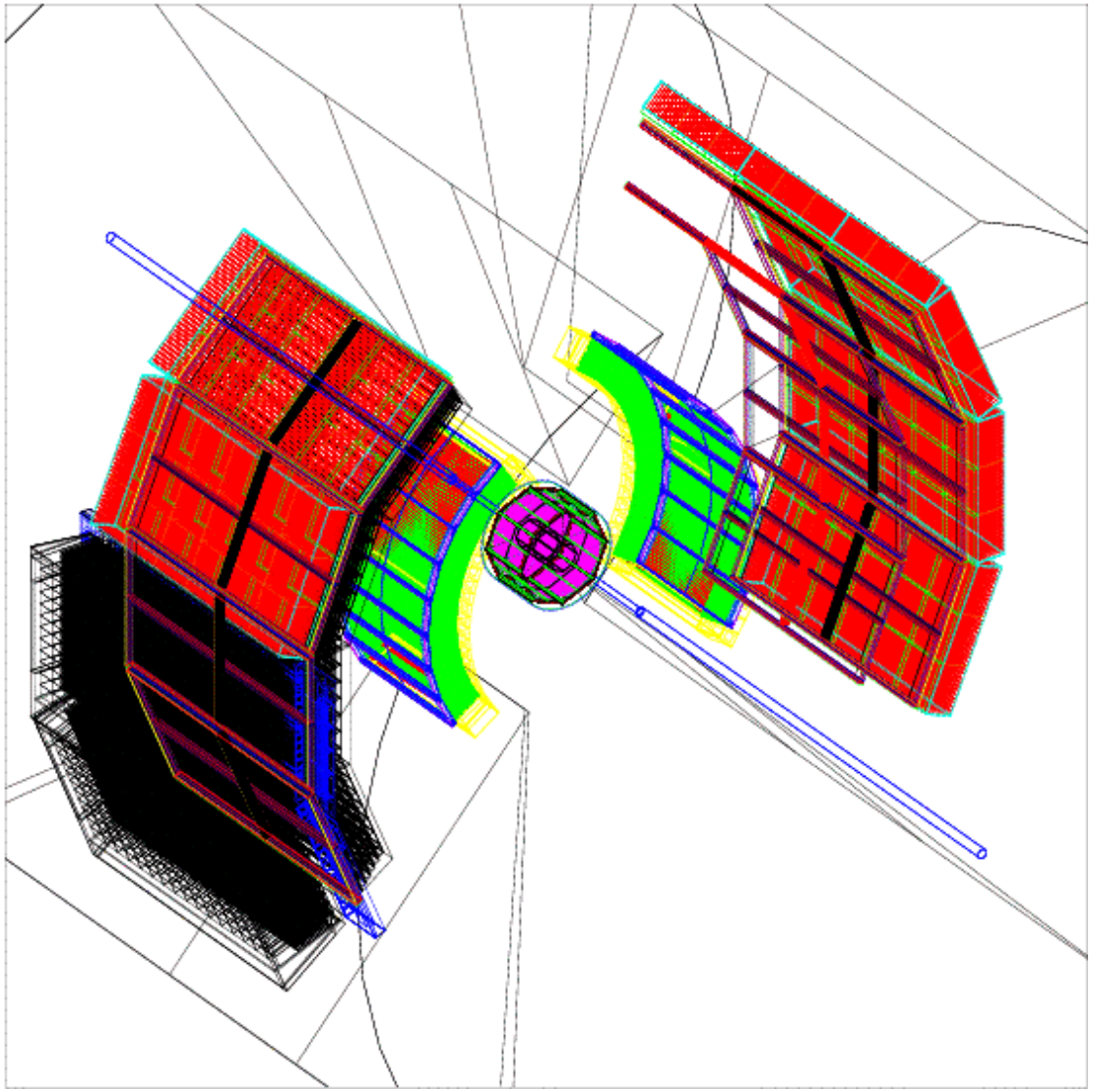
Hadron Blind Detector

- 10-15 cm outside of TPC
- Separate CsI pad detector for each octant of the TPC



TPC/HBD in PHENIX

- Simulation of TPC/HBD already integrated into the current PHENIX detector
- Only 2π subdetector in PHENIX!



Still in the early stages

Plenty remains to be done!

- Enhance simulation to include drift, tracking algorithm, more realistic detector response and readout
- Examine occupancy in high multiplicity events to help determine the pad size and timing resolution needed
- Determine drift/radiator gas
- Study different magnetic field settings
- Study Dalitz rejection and preservation of signal for low-mass vector mesons
- Determine particle ID capabilities using dE/dx and the HBD
- Investigate effects on tracking in the rest of PHENIX
- Integrate with proposed PHENIX silicon upgrade detectors
- Examine capabilities of TPC/HBD vs. HBD alone
- Evaluate performance in pp, pA, AA